IN THE CLAIMS

1. (Currently Amended) A fluid control device used in a borehole, comprising:
a housing containing a first piston;
a magnetorheological fluid disposed within said housing;
a magnetic assembly capable of switchably creating a magnetic field which passes through said housing, wherein said magnetic field can be partially or fully canceled;
wherein blockage of the flow of magnetorheological fluid through said housing by a magnetic field, wherein said magnetic field acts substantially perpendicular to a pressure gradient and impedes movement of said piston.

2. (Original) The device of claim 1, wherein total blockage of said flow stops movement of said piston.

3. (Original) The device of Claim 1, wherein partial blockage of said flow slows movement of said piston.

4. (Original) The device of Claim 1, wherein said magnetic assembly comprises a permanent magnet and an electromagnet and the un-powered state of said magnetic assembly generates a magnetic field.

5. (Original) The device of claim 1, wherein said magnetic assembly comprises an electromagnet and the powered state of said magnetic assembly generates a magnetic field.

6. (Original) The device of Claim 1, wherein said piston is held immobile by an unpowered magnetic assembly, providing a safety lock.

7. (Original) The device of Claim 1, wherein movement of said piston is controlled to provide a time-delay device.

8. (Currently Amended) A system for drilling or producing oil and gas, comprising:
a string of tools deployed in a borehole;
a housing containing a first piston;
a magnetorheological fluid disposed within said housing;

a magnetic assembly capable of switchably creating a magnetic field which passes through said housing, wherein said magnetic field can be partially or fully canceled;

wherein blockage of the flow of magnetorheological fluid through said housing by a magnetic field, wherein said magnetic field acts substantially perpendicular to a pressure gradient and impedes movement of said piston.

9. (Original) The system of claim 8, wherein total blockage of said flow stops movement of said piston.

10. (Original) The system of Claim 8, wherein partial blockage of said flow slows movement of said piston.

11. (Original) The system of Claim 8, wherein said magnetic assembly comprises a permanent magnet and an electromagnet and the un-powered state of said magnetic assembly generates a magnetic field.

12. (Original) The system of claim 8, wherein said magnetic assembly comprises an electromagnet and the powered state of said magnetic assembly generates a magnetic field.

13. (Original) The system of claim 8, wherein said piston is held immobile by an unpowered magnetic assembly, providing a safety lock.

14. (Currently Amended) A method of blocking or delaying a downhole event, comprising the steps of:

connecting a housing containing a piston in such a manner that completion of said downhole event is dependent on said piston arriving at a given location within said housing;

disposing a magnetorheological fluid within said housing in such a manner that said piston is blocked from said given location;

creating a magnetic field through at least a portion of said magnetorheological fluid, wherein said magnetic field can be partially or fully canceled, and wherein said magnetic field acts substantially perpendicular to a pressure gradient.

15. (Original) The method of claim 14, wherein said creating step creates a magnetic field of sufficient magnitude to prevent movement of said piston through said magnetorheological fluid.

16. (Previously Presented) A method of blocking or delaying a downhold event, comprising the steps of:

connecting a housing containing a piston in such a manner that completion of said downhole event is dependent on said piston arriving at a given location within said housing;

disposing a magnetorheological fluid within said housing in such a manner that said piston is blocked from said given location;

creating a magnetic field through at least a portion of said magnetorheological fluid,

wherein said creating step creates a magnetic field of sufficient magnitude to slow, but not stop, movement of said piston through said magnetorheological fluid.

17. (Withdrawn) A position control device, comprising:

an outer section of pipe, capable of connection to a string of tools in a borehole;

an inner section of pipe, slideably connected to said outer pipe;

wherein movement of said inner pipe within said outer pipe is partially controlled by the flow of a magnetorheological fluid through a magnetic assembly.

18. (Withdrawn) The position control device of Claim 17, wherein said outer section of pipe and said inner section of pipe are part of a travel joint.

19. (Withdrawn) The position control device of Claim 17, wherein said outer section of pipe and said inner section of pipe are part of a circulating valve.

20. (Withdrawn) The position control device of Claim 17, wherein said magnetic assembly comprises an electromagnet.

21. (Withdrawn) The position control device of Claim 17, wherein said magnetic assembly comprises a permanent magnet and an electromagnet.

22. (Withdrawn) A system for drilling or producing oil or gas, comprising:

a string of tools deployed in a borehole, wherein said string of tools includes

an outer section of pipe, capable of connection to said string of tools; and

an inner section of pipe, slideably connected to said outer pipe;

wherein movement of said inner pipe within said outer pipe is partially controlled by the flow of a magnetorheological fluid through a magnetic assembly.

23. (Withdrawn) The system of Claim 22, wherein said outer section of pipe and said inner section of pipe are part of a travel joint.

24. (Withdrawn) The system of Claim 22, wherein said outer section of pipe and said inner section of pipe are part of a circulating valve.

25. (Withdrawn) The system of Claim 22, wherein said magnetic assembly comprises an electromagnet.

26. (Withdrawn) The system of Claim 22, wherein said magnetic assembly comprises a permanent magnet and an electromagnet.

27. (Withdrawn) A method of controlling the relative position, in a borehole, of an outer section of pipe relative to an inner section of pipe, comprising the steps of:

tying the movement of said inner section of pipe relative to said outer section of pipe to a piston that moves within a chamber filled with magnetorheological fluid;

applying a magnetic field to a portion of said magnetorheological fluid that affects movement of said piston within said chamber.

28. (Withdrawn) The method of Claim 27, wherein said applying step applies a magnetic field that prevents movement of said piston within said chamber.

29. (Withdrawn) The method of Claim 27, wherein said applying step applies a magnetic field that slows, but does not stop, movement of said piston within said chamber.

30. (Withdrawn) A logic circuit wherein logical values are embodied as solid state valves, each comprising a magnetic assembly controlling the passage of a magnetorheological fluid.

31. (Withdrawn) The logic circuit of Claim 30, wherein each embodiment of a logical value comprises a first and a second solid state valve for a magnetorheological fluid.

32. (Withdrawn) The logic circuit of Claim 30, further comprising connections to a high-pressure line and to a low-pressure line.

33. (Withdrawn) The logic circuit of Claim 30, wherein said magnetic assembly comprises an electromagnet.

34. (Withdrawn) The logic circuit of Claim 30, wherein said magnetic assembly comprises a permanent magnet and an electromagnet.

35. (Withdrawn) A system for drilling or producing oil or gas, comprising

a string of tools deployed in a borehole; and

a plurality of solid state valves, each solid state valve comprising a magnetic assembly controlling the passage of a magnetorheological fluid, said plurality of solid state valves being part of said string of tools;

wherein said plurality of solid state valves are connected to provide control inputs for ones of said string of tools.

36. (Withdrawn) The system of Claim 35, wherein pairs of said solid-state valves embody logical values.

37. (Withdrawn) The system of Claim 35, further comprising connections from ones of said solid state valves to a high-pressure line and connections from ones of said solid-state valves to a low-pressure line.

38. (Withdrawn) The system of Claim 35, wherein said magnetic assembly comprises an electromagnet.

39. (Withdrawn) The system of Claim 35, wherein said magnetic assembly comprises a permanent magnet and an electromagnet.

40. (Withdrawn) A method of controlling a downhole device, comprising the steps of:

assigning a logical value to a magnetorheological valve being open and an opposite value to said magnetorheological valve being closed;

connecting a plurality of magnetorheological valves together to accept at least one input and produce at least one output;

wherein said output provides a control for said downhole device.

41. (Withdrawn) A device for preventing the flow of fluids through a downhole region, comprising:

a magnetic assembly capable of switchably producing a magnetic field through said downhole region; and

a volume of magnetorheological fluid;

wherein the passage of non-magnetorheological fluids can be blocked by the presence of magnetorheological fluid under the influence of said magnetic assembly.

42. (Withdrawn) The device of Claim 41, wherein said device is a packer.

43. (Withdrawn) The device of Claim 41, wherein said device is a plug.

44. (Withdrawn) The device of Claim 41, wherein said magnetic assembly comprises an electromagnet.

45. (Withdrawn) The device of Claim 41, wherein said magnetic assembly comprises a permanent magnet and an electromagnet.

46. (Withdrawn) The device of Claim 41, further comprising a container that surrounds said magnetorheological fluid when not under the influence of said magnetic assembly.

47. (Withdrawn) A system for drilling or producing oil or gas, comprising:

a string of tools deployed in a borehole;

a magnetic assembly, capable of switchably producing a magnetic field through said downhole region, that is a part of said string of tools; and

a volume of magnetorheological fluid;

wherein the passage of non-magnetorheological fluids can be blocked by the presence of magnetorheological fluid under the influence of said magnetic assembly.

48. (Withdrawn) The system of Claim 47, wherein said magnetic assembly is part of a packer.

49. (Withdrawn) The system of Claim 47, wherein said magnetic assembly is part of a plug.

50. (Withdrawn) The system of Claim 47, wherein said magnetic assembly comprises an electromagnet.

51. (Withdrawn) The system of Claim 47, wherein said magnetic assembly comprises a permanent magnet and an electromagnet.

52. (Withdrawn) The system of Claim 47, further comprising a container that surrounds said magnetorheological fluid when not under the influence of said magnetic assembly.

53. (Withdrawn) A method of drilling or producing oil or gas, comprising the steps of:

deploying a volume of magnetorheological fluid under the influence of a magnetic field in a region in which it is desired to block the flow of non-magnetorheological fluid.

54. (Withdrawn) The method of Claim 53, wherein said deploying step comprises compressing a flexible sack containing said magnetorheological fluid prior to applying a magnetic field.

55. (Withdrawn) The method of Claim 53, wherein said magnetorheological fluid is deployed in the annulus between a string of tools and a casing in a borehole.

56. (Previously Presented) A system for drilling or producing oil and gas, comprising:
a string of tools deployed in a borehole;

a housing containing a first piston;

a magnetorheological fluid disposed within said housing;

a magnetic assembly having a working gap having a first magnetic field strength and a reluctance gap having a second magnetic field strength capable of switchably changing said first magnetic field strength and said second magnetic field strength passing through said housing; wherein blockage of the flow of magnetorheological fluid through said housing by said first magnetic field strength impedes movement of said piston.

57. (Previously Presented) The system of claim 56, wherein total blockage of said flow stops movement of said piston.

58. (Previously Presented) The system of claim 56, wherein partial blockage of said flow slows movement of said piston.

59. (Previously Presented) The system of claim 56, wherein said magnetic assembly comprises a permanent magnet and an electromagnet and the un-powered state of said magnetic assembly generates said first magnetic field strength and said second magnetic field strength.

60. (Previously Presented) The system of claim 56, wherein said magnetic assembly comprises an electromagnet and the powered state of said magnetic assembly generates said first magnetic field strength and said second magnetic field strength.

61. (Previously Presented) The system of claim 56, wherein said piston is held immobile by an unpowered magnetic assembly, providing a safety lock.

62. (Previously Presented) A fluid control device used in a borehole, comprising:

a housing containing a first piston;

a magnetorheological fluid disposed within said housing;

a magnetic assembly capable of switchably creating a magnetic field which passes through said housing;

wherein said magnetic field is switchably created by a short circuit or an open circuit; and

wherein blockage of the flow of magnetorheological fluid through said housing by a magnetic field impedes movement of said piston.

63. (Previously Presented) The device of claim 62, wherein said open circuit is created by a hydraulic pressure.

64. (Previously Presented) The device of claim 62, wherein said open circuit is created by a mechanical force.

65. (Previously Presented) The device of claim 62, wherein said short circuit is created by a hydraulic pressure.

66. (Previously Presented) The device of claim 62, wherein said short circuit is created by a mechanical force.

67. (Previously Presented) The device of claim 62, wherein total blockage of said flow stops movement of said piston.

68. (Previously Presented) The device of claim 62, wherein partial blockage of said flow slows movement of said piston.

69. (Previously Presented) The device of claim 62, wherein said magnetic assembly comprises a permanent magnet and the un-powered state of said magnetic assembly generates a magnetic field.

70. (Previously Presented) The device of claim 62, wherein said piston is held immobile by an unpowered magnetic assembly, providing a safety lock.

71. (Previously Presented) The device of claim 62, wherein movement of said piston is controlled to provide a time-delay device.